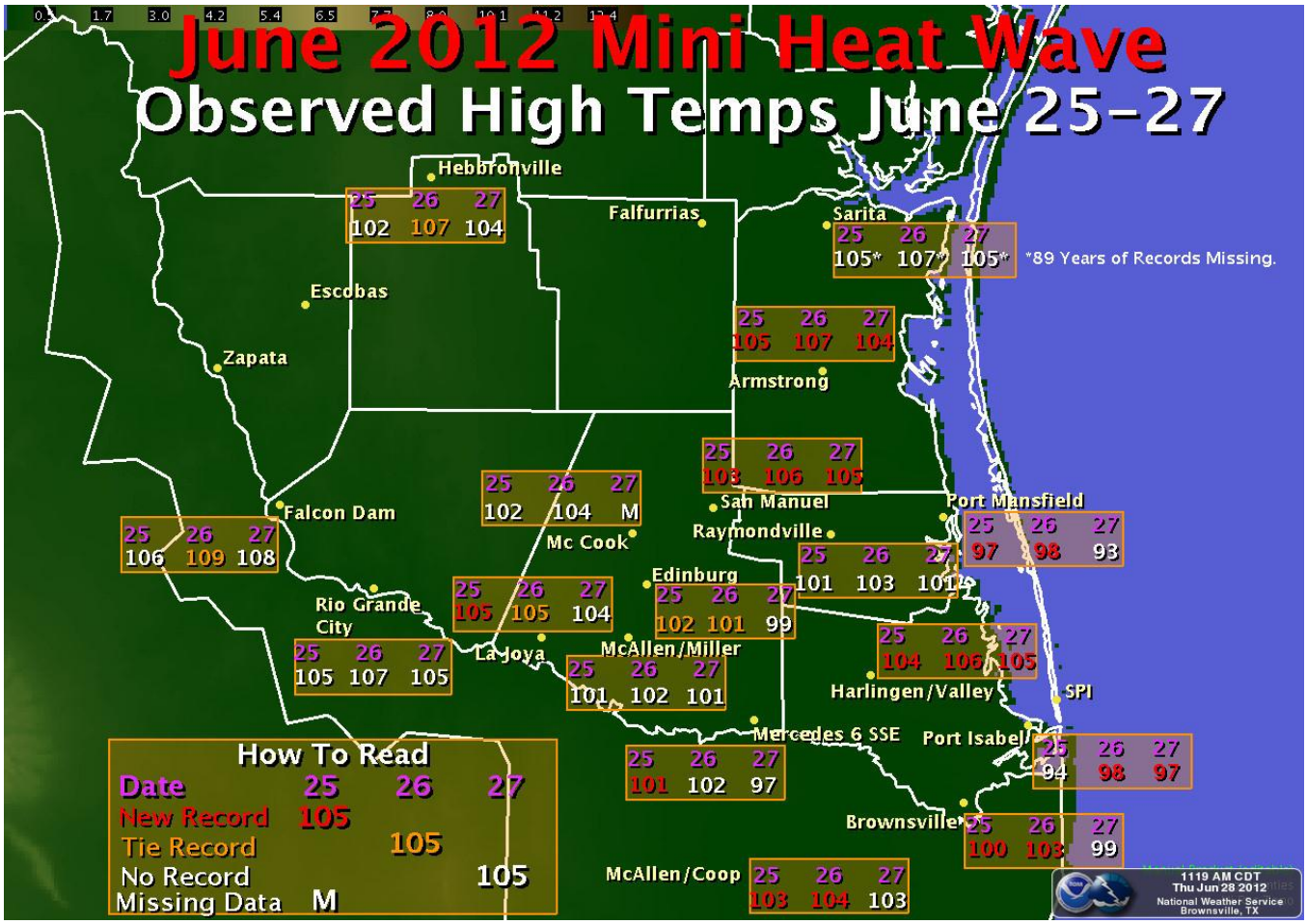
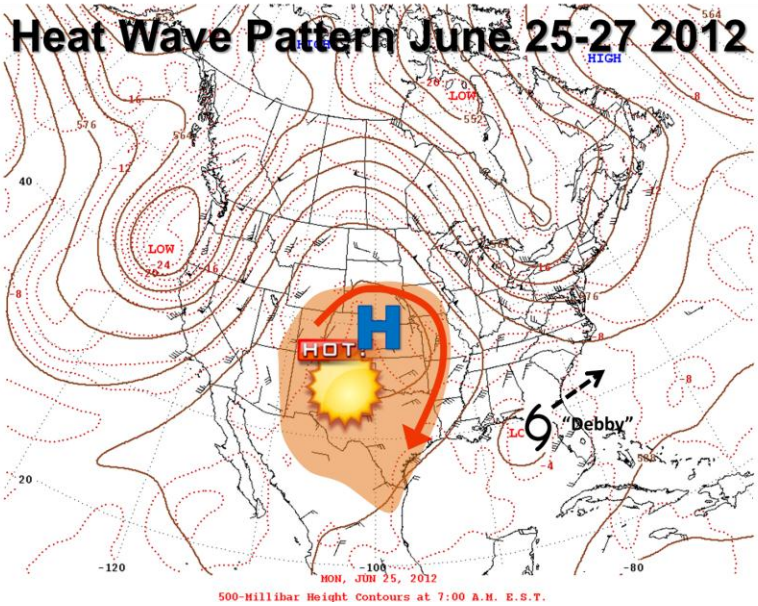


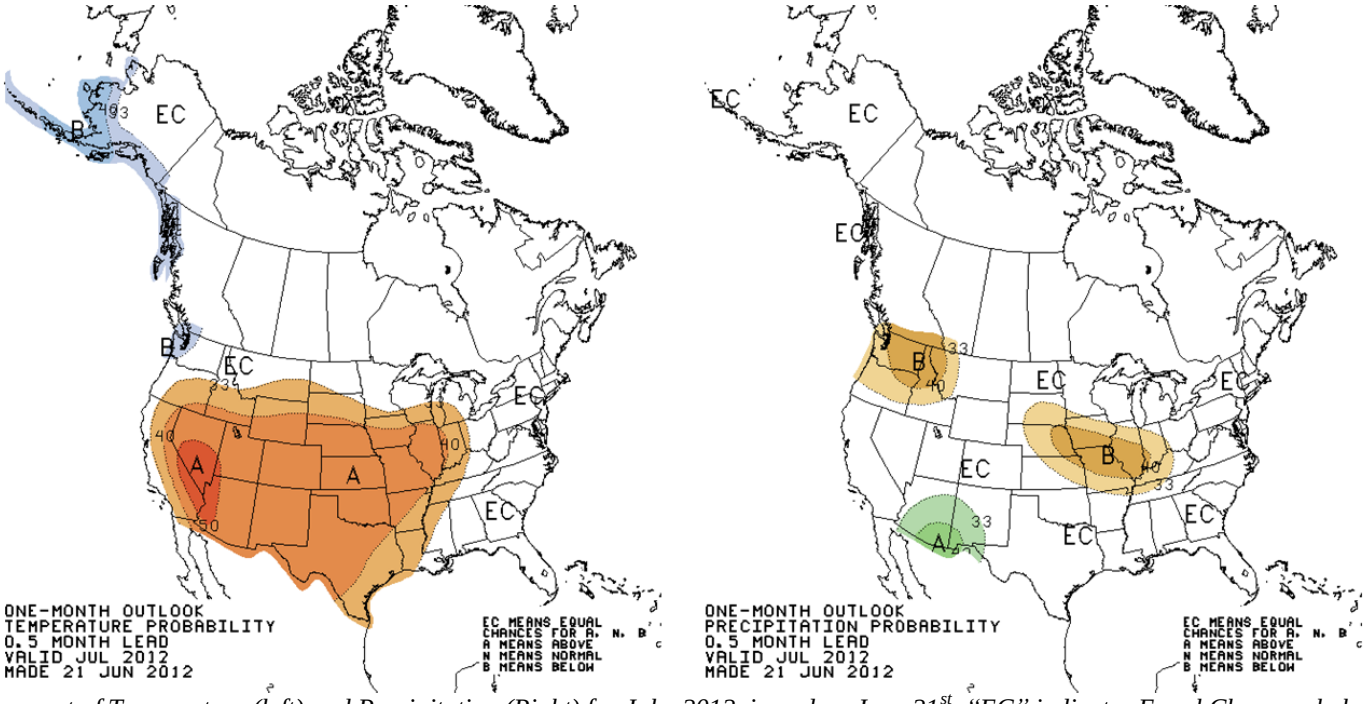
The Heat…

Three-Day Heat Wave Rivals [Labor Day Weekend 2011]

The combination of broad high pressure from the earth's surface high into the atmosphere, the departure of tropical cyclone Debby (right), sunshine with little cloudiness, and low level winds from the north brought a three-day heat wave to the Rio Grande Valley to begin the first full work week of the Julian calendar summer (June 20th through September 22nd 2012). Calendar-day high temperatures tied or broke records, mainly across the Lower and Mid Rio Grande Valley (Hidalgo County to the coast – above). The three-day period was the hottest in the Rio Grande Valley since the Labor Day weekend of 2011 (September 3rd through 5th); the atmospheric pattern was similar; Tropical Storm Lee moved slowly along the Louisiana coast while low level high pressure brought dry and hot northwest flow to all of Texas.



Fortunately, the dry air kept relative humidity values in check, with daytime heat index, or "feels-like" temperatures, about the same as the actual temperature. Past years with similar hot late June periods included 2009, 1980, and 1943.



Forecast of Temperature (left) and Precipitation (Right) for July, 2012, issued on June 21st. "EC" indicates Equal Chances; below, average, and above values each equal 33.3 percent.

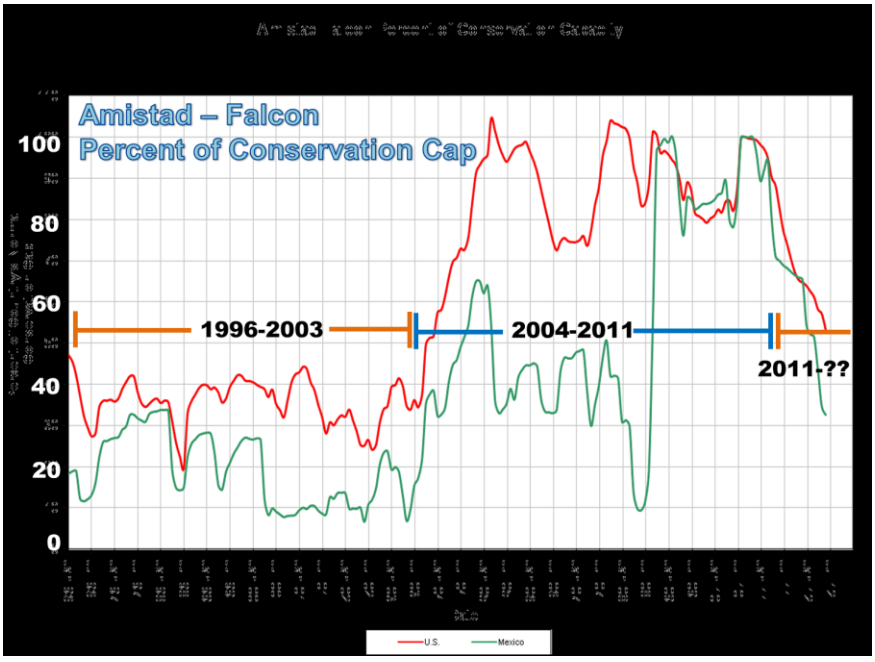
…and the Drought

How Will July, and Perhaps the Rest of Summer, Fare?

June continued a four month stretch of above average temperatures across the Rio Grande Valley, and below average precipitation for the majority of locations. What does the remainder of summer 2012 have in store for the region? A lot of things can happen between now and the end of September, but one thing is crystal clear: The long term drought, which has ranged from moderate to exceptional at one time or another for most of the Rio Grande Valley since early 2011, will only break with efficient, soaking rains provided by a tropical cyclone – whether a slow moving tropical depression or storm, or a hurricane.

July's Potential

July is typically a month with a "lull" in rainfall, while temperatures reach their annual peak. That is not good news for a region that has seen abundant, widespread rainfall on few occasional since the current dry period began at the end of September, 2010. A dry, hot July will continue to steady decrease of flows into and from the Rio Grande Reservoirs of Amistad (59 percent of conservation at the end of June) and Falcon (24 percent of conservation at the end of June). The graph at right[1] shows just how rapidly pool levels dropped, based on the difference between Amistad and Falcon since the swollen dams during the summer of 2010. Levels below 24 percent at Falcon would be on par with a prior drought in 1997/1998, when levels fell below 20 percent.

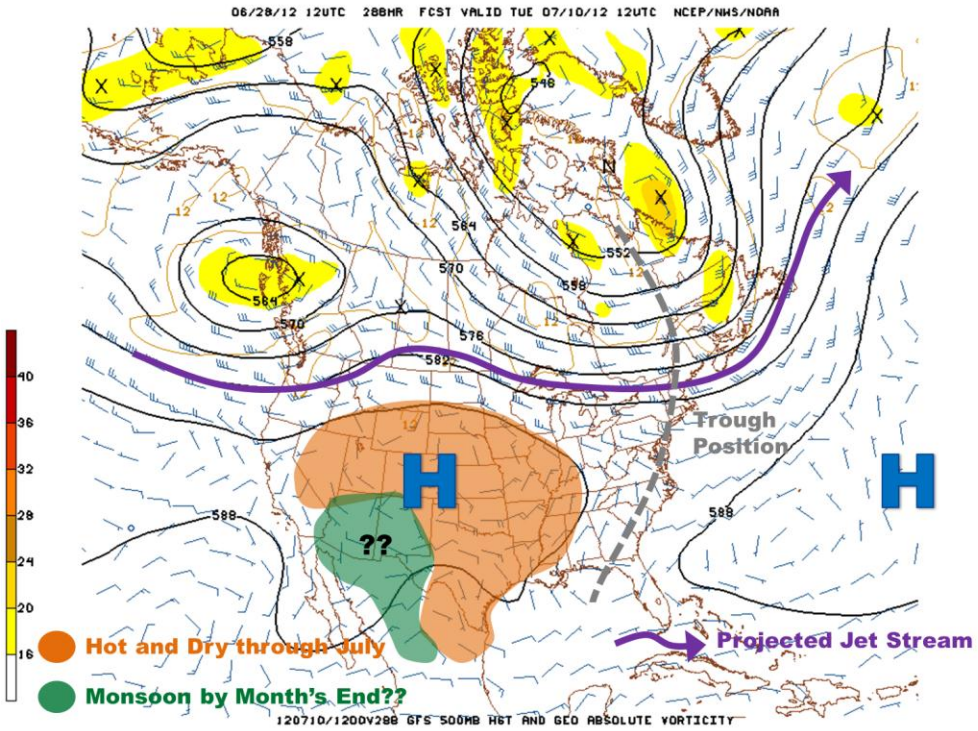


July 2012 is *leaning* toward being drier than already low average precipitation totals, and hotter than average for the seventh consecutive month. Why the broken record? A number of factors may be contributing. The persistence of a sprawling high pressure ridge from the southern and central Plains into the intermountain west, extending southward at time into northern Mexico would reduce the ability for the atmosphere push or develop deep tropical moisture needed for significant rainfall (below). This pattern – high pressure across the central/southern Plains with weak troughs dropping into the northeast U.S. and southeast Canada – may be related to the phase of the North Atlantic Oscillation (NAO, next page, left), which, for a third straight summer, appears to be negative. Negative phase NAO in summer help build and "lock in" the southern Plains/southwest U.S. ridge, which often stretches across the Gulf into the tropical Atlantic. Finally, El Niño is expected to develop in July (next page, center); summer El Niño conditions have some positive correlation with the aforementioned ridge (known colloquially as "La Canícula", or "Dog Days").

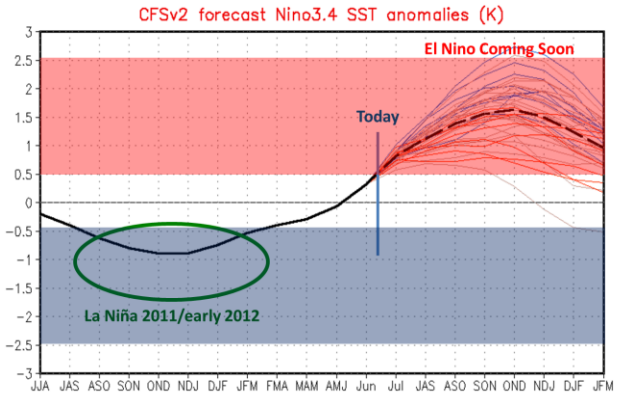
Beyond July

How will the developing El Niño contribute to the Valley's tropical weather regime? Is a repeat of the summer of 2009, which featured a similar El Niño/Southern Oscillation trend which migrated quickly from weak La Niña to weak El Niño between late winter and early summer? Will the NAO phase remain negative for much of the summer, 2012, as it did for the past three summers? These answers remain to be seen. Overall, conditions are ripe for another dry, hot summer. But, as Hurricane Andrew showed the Nation in 1992, one storm coming through a short term window of opportunity in *any* season could provide the necessary rainfall to put a serious and perhaps permanent dent in a drought.

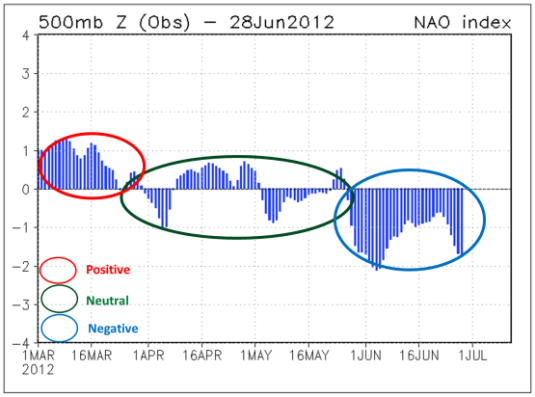
If rainfall is scarce and temperatures remain hotter than average through September***, regional water shortages will follow*** as reservoir and aquifer levels fall dangerously low and will be unable to provide enough water to the Rio Grande Valley for routine use. One possible light at the end of the tunnel is an increasing potential for winter rains (December 2012 through February 2013), which, combined with low evaporation rates, could save the region from longer term troubles by spring 2013. Let's hope so.



Above: Global Forecast System prediction for July 10th, 2012, issued on June 28th. Pattern indicated is expected to be common during July 2012.



El Niño/Southern Oscillation trend (June 2011 to June 2012) and Forecast (June 2012 through early 2013). "Today" is approximately June 25th, 2012.



North Atlantic Oscillation Index, March through June 2012.

[1] Chart shows differences in percent of conservation capacity, Amistad minus Falcon Reservoir. The values are ***not*** the same as individual reservoir pool levels. Drier and wetter periods are indicated by rises and falls of capacity differences; the box/whisker delineation indicates a dry period between 1996 and 2003; a wet period between 2004 and 2010, and a return to drying since 2011. Chart courtesy of the International Boundary and Water Commission.